

HIRAD Airborne Wind Speeds from 2010-15

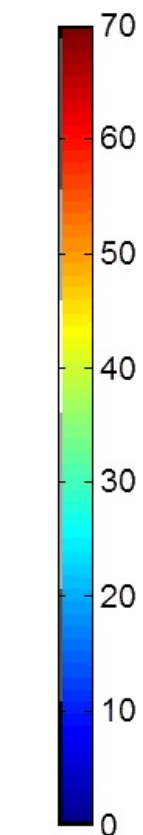
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Sayak K. Biswas

Universities Space Research Association



WS
(m/s)

Image Landsat
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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
US Dept of State Geographer

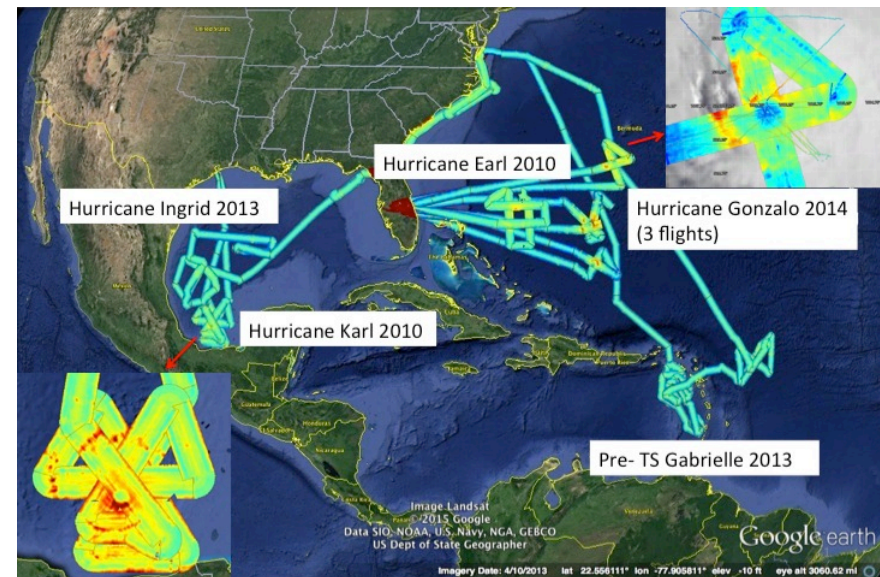
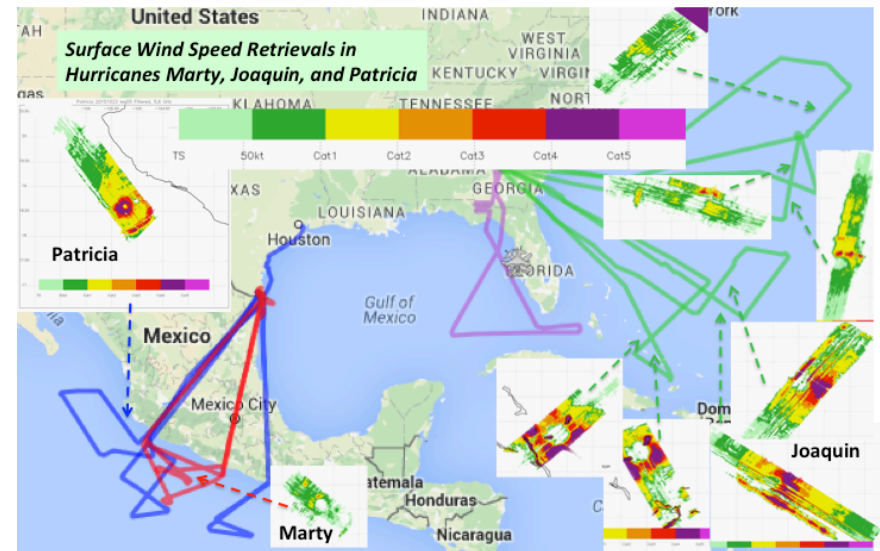
Google earth

Imagery Date: 12/13/2015 25°02'19.21" N 89°12'18.19" W elev. -10194 ft eye alt 3079.88 mi

- Purpose of this talk is to give an overview of the HIRAD “catalog” of data available for analysis

Earl 2010 Gabrielle 2013 Joaquin 2015 (4 days)
 Karl 2010 Ingrid 2013 Patricia 2015 (3 days)
 Gonzalo 2014 (3 days) Marty 2015 (2 days)

- Data quality varies; some of our “lessons learned” have not been applied to all the previous cases
- If you want to incorporate HIRAD data into a study of any of these storms, let us know – *we might be able to produce a better retrieval than currently on hand*





PATRICIA 2015

Daniel.J.Cecil@nasa.gov

ONR Tropical
Cyclone Intensity
(TCI) field program

WB-57 with HIRAD
and High Density
Dropsonde System

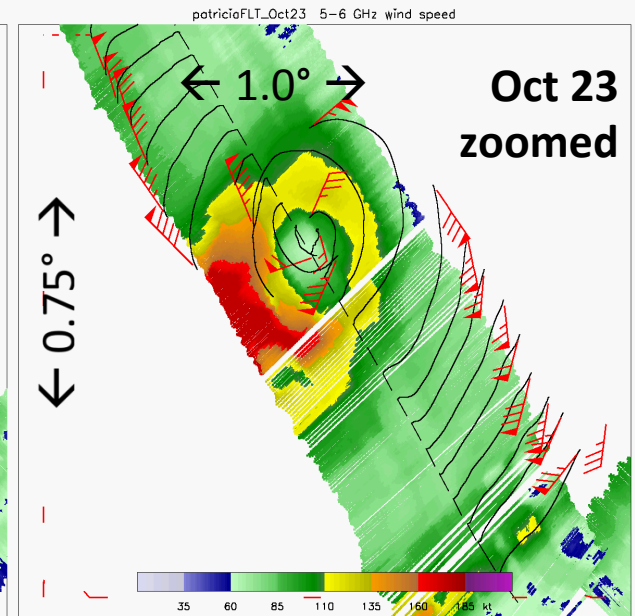
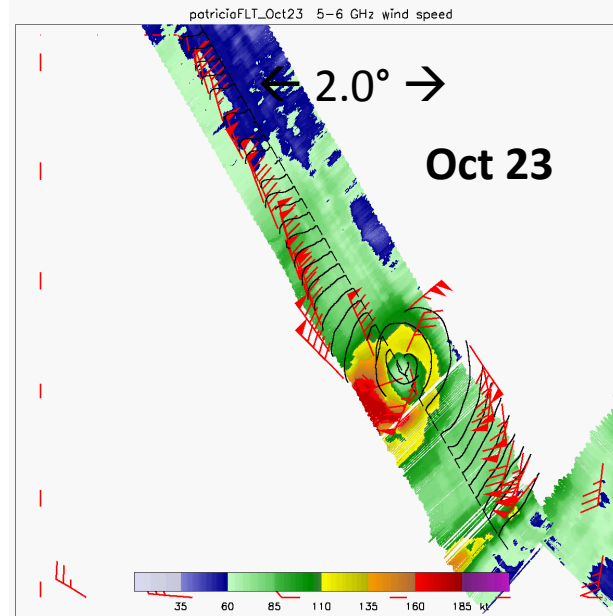
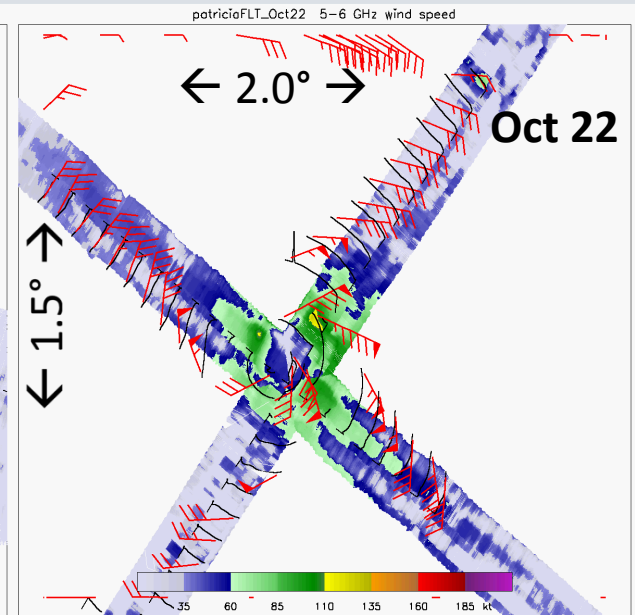
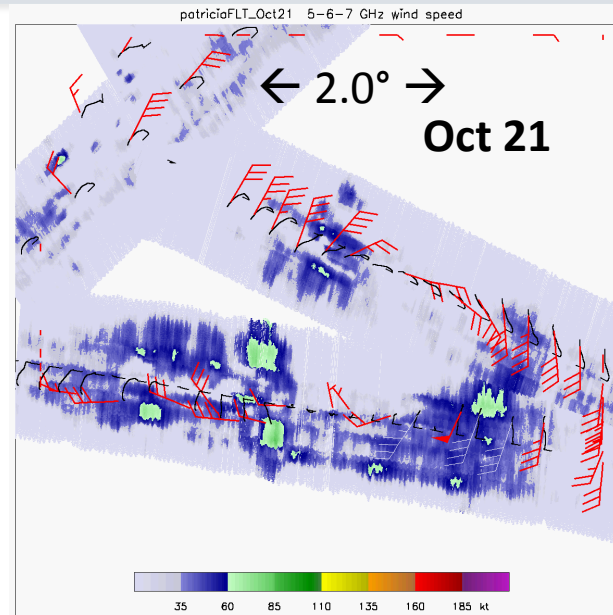
October 21, 22, 23

Rapid
Intensification (21st,
22nd) and just after
record intensity
(23rd)

Dramatic eyewall
development and
contraction

← 1.5° →

← 1.5° →





JOAQUIN 2015

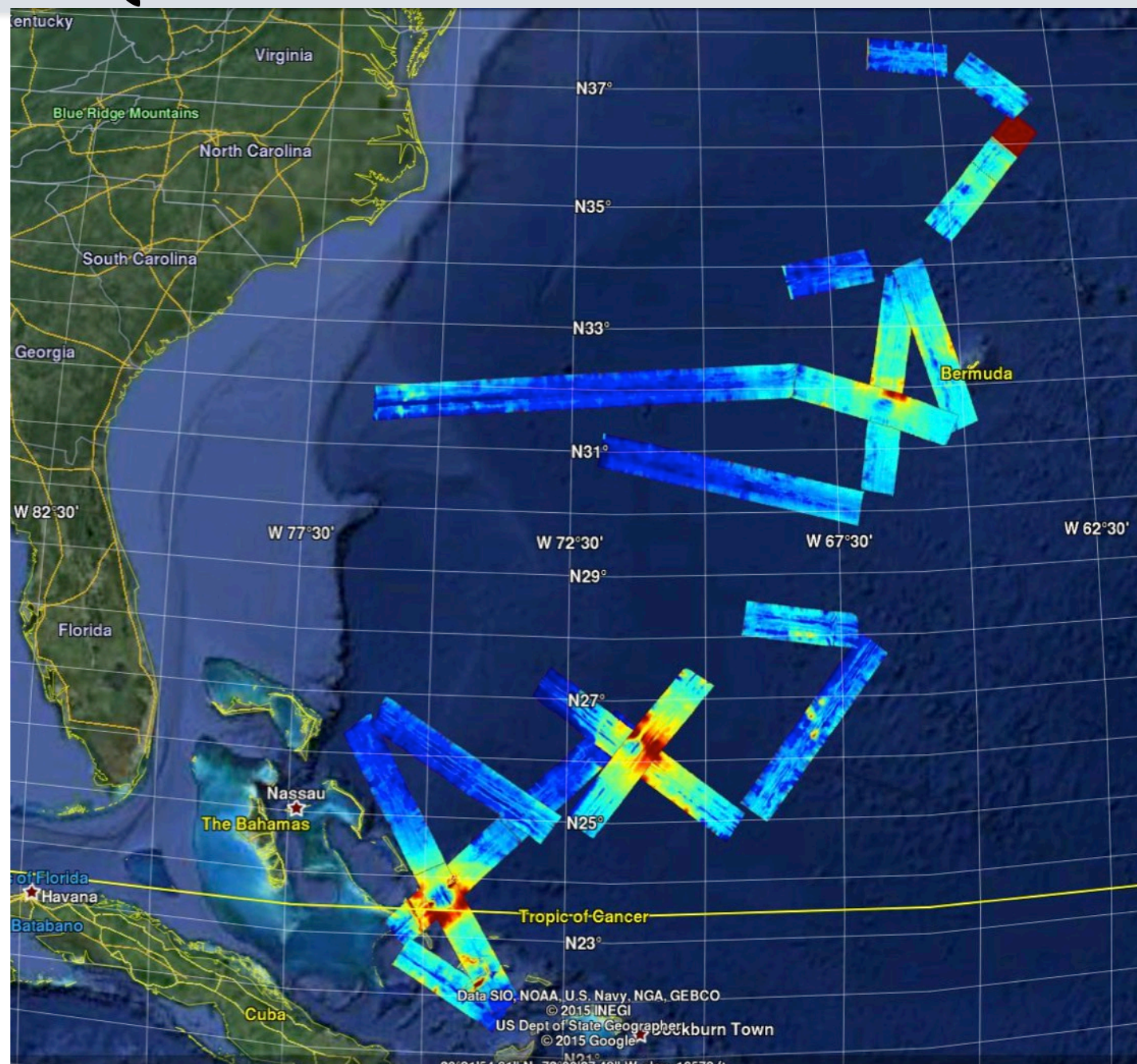
Daniel.J.Cecil@nasa.gov

ONR Tropical
Cyclone Intensity
(TCI) field program

WB-57 with HIRAD
and High Density
Dropsonde System

October 2, 3, 4, 5

Rapid
Intensification was
ending around time
of 03 October flight





JOAQUIN 2015

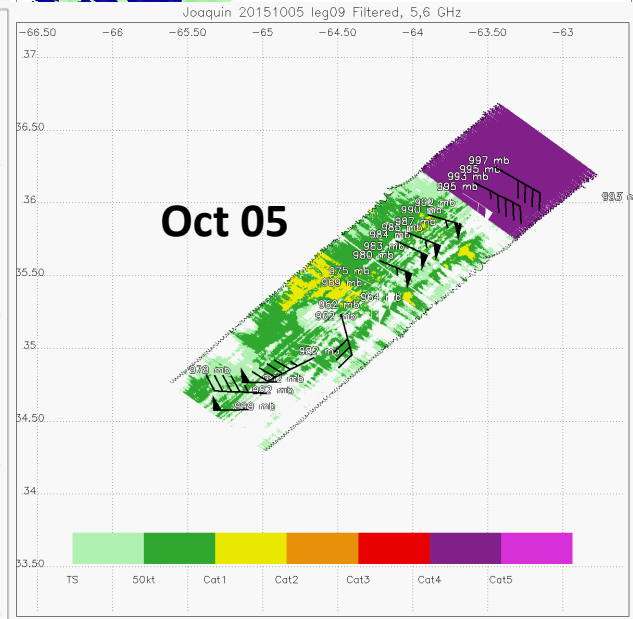
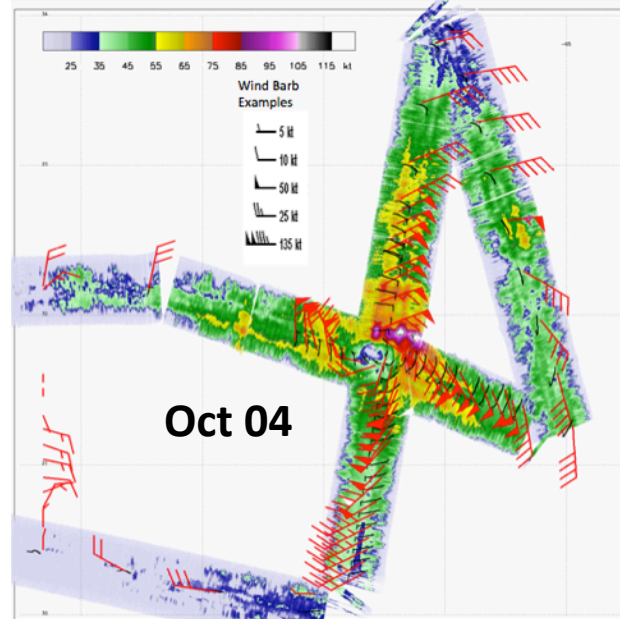
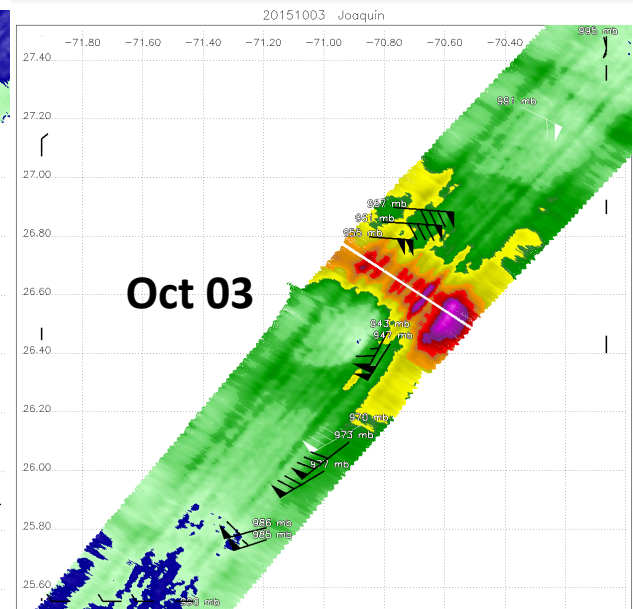
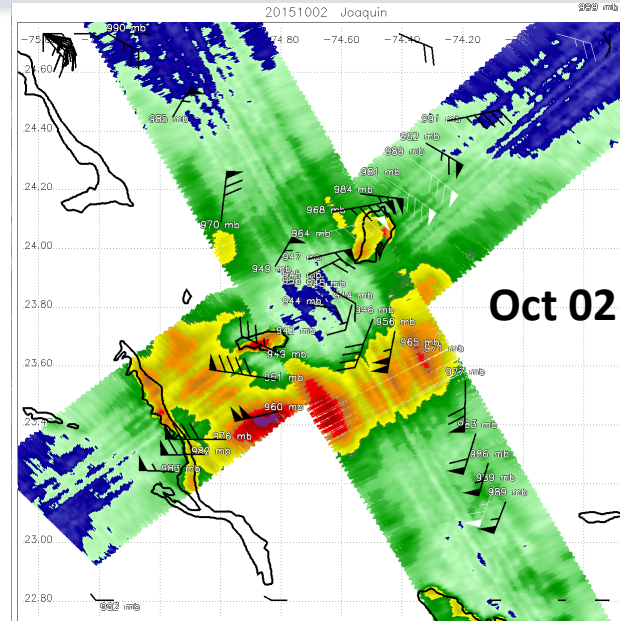
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ONR Tropical
Cyclone Intensity
(TCI) field program

WB-57 with HIRAD
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October 2, 3, 4, 5

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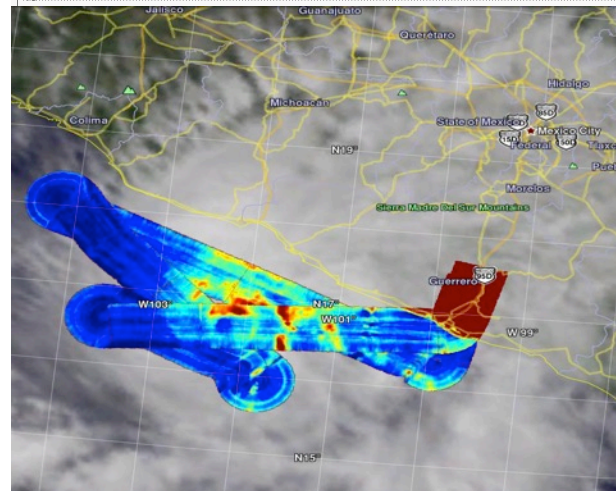
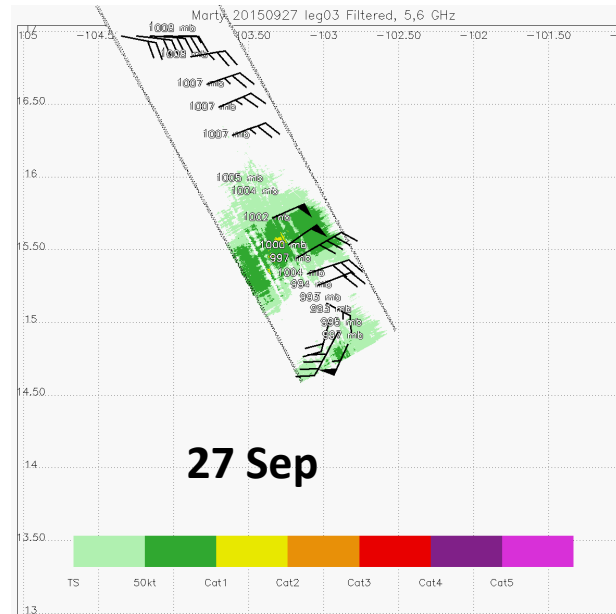


ONR Tropical
Cyclone Intensity
(TCI) field program

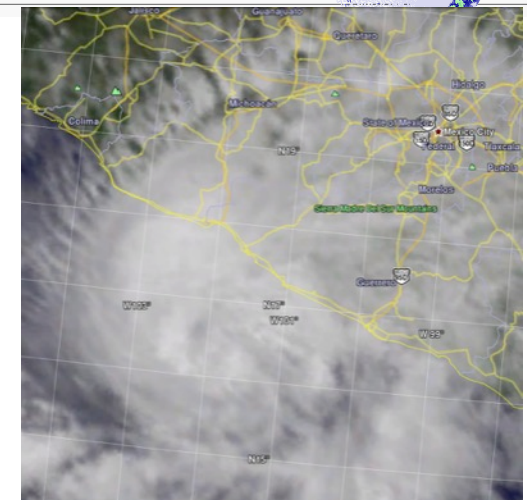
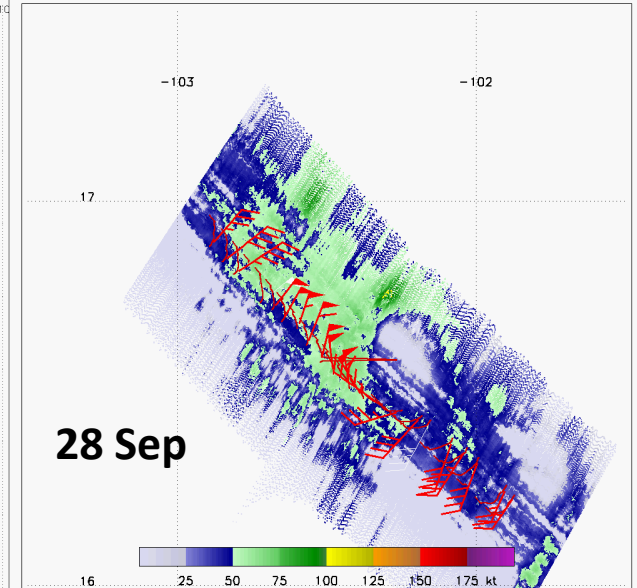
WB-57 with HIRAD
and High Density
Dropsonde System

September 27-28

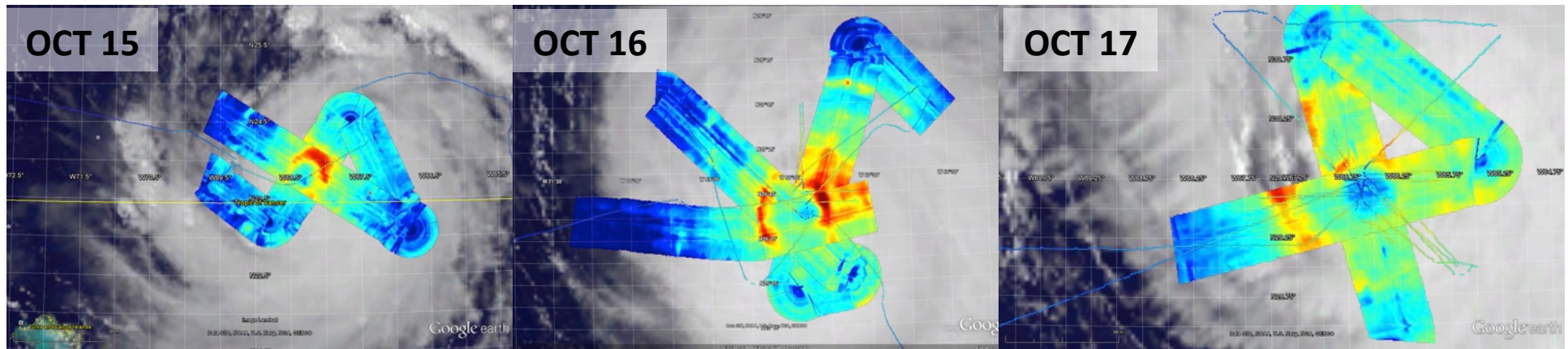
High-end tropical
storm on 27th
Low-end hurricane
on 28th



7 GHz Brightness Temperatures
from HIRAD



GOES Satellite Image



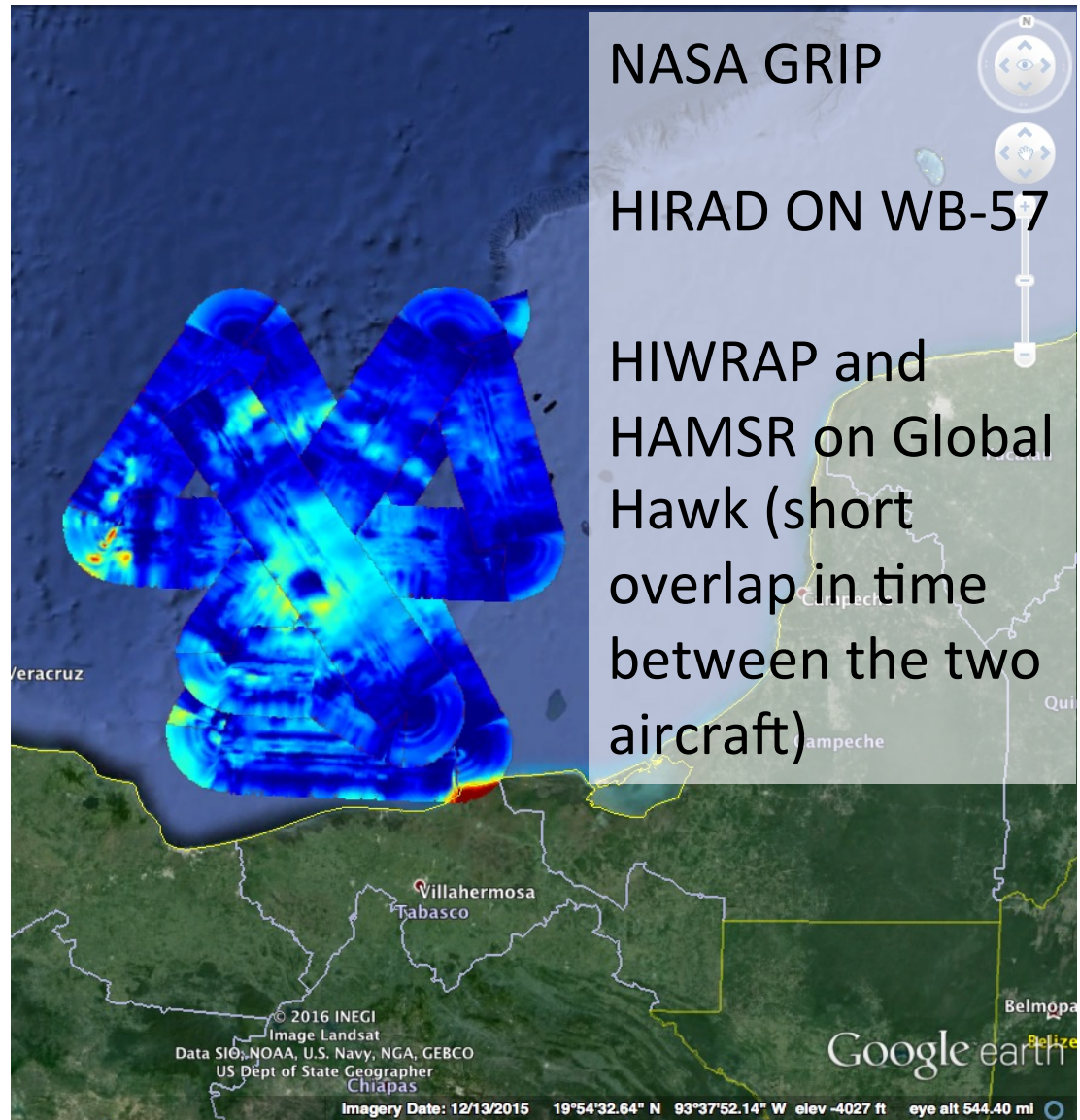
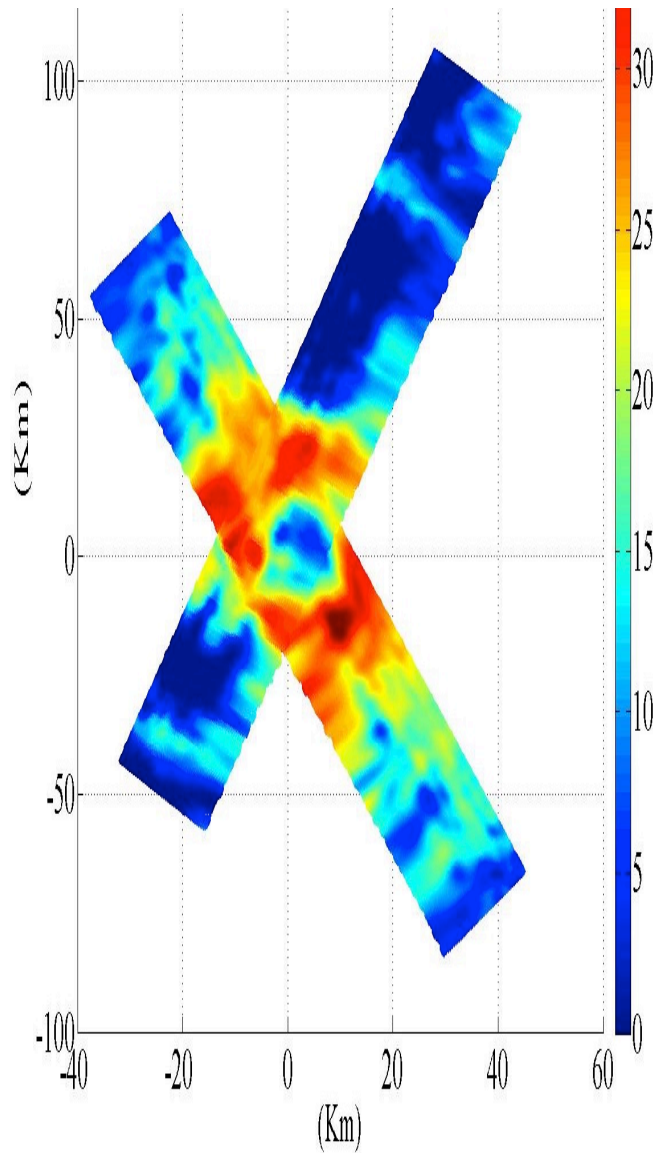
NASA HS3 and ONR TCI

WB-57, HIRAD + HIWRAP

Oct 15, 16, 17

*This is the only set of flights with
HIRAD and HIWRAP both
operating over a “good” target
with “good” flight patterns*

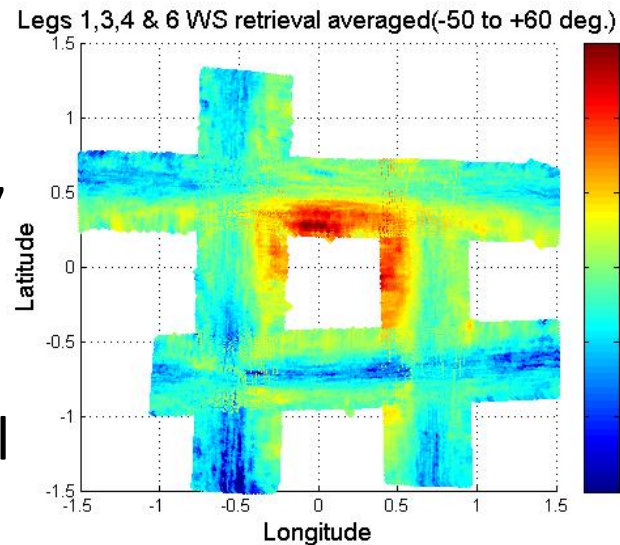
Combination of instruments could
allow examination of a unique 3-D
mapping of the wind structure



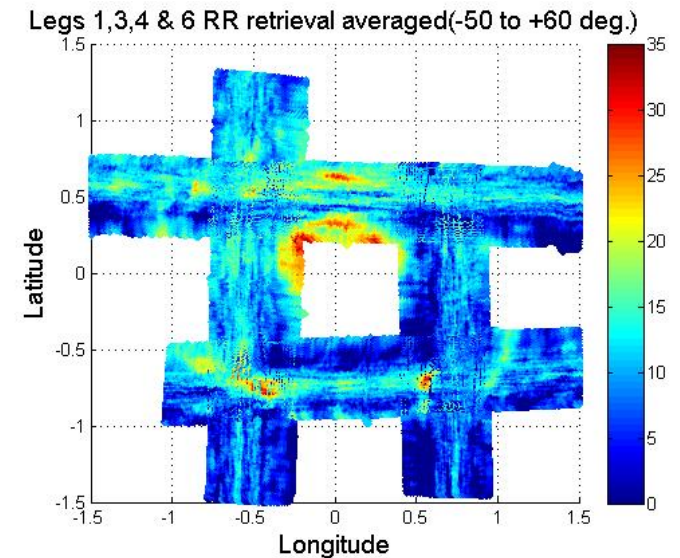
NASA GRIP

HIRAD ON WB-57

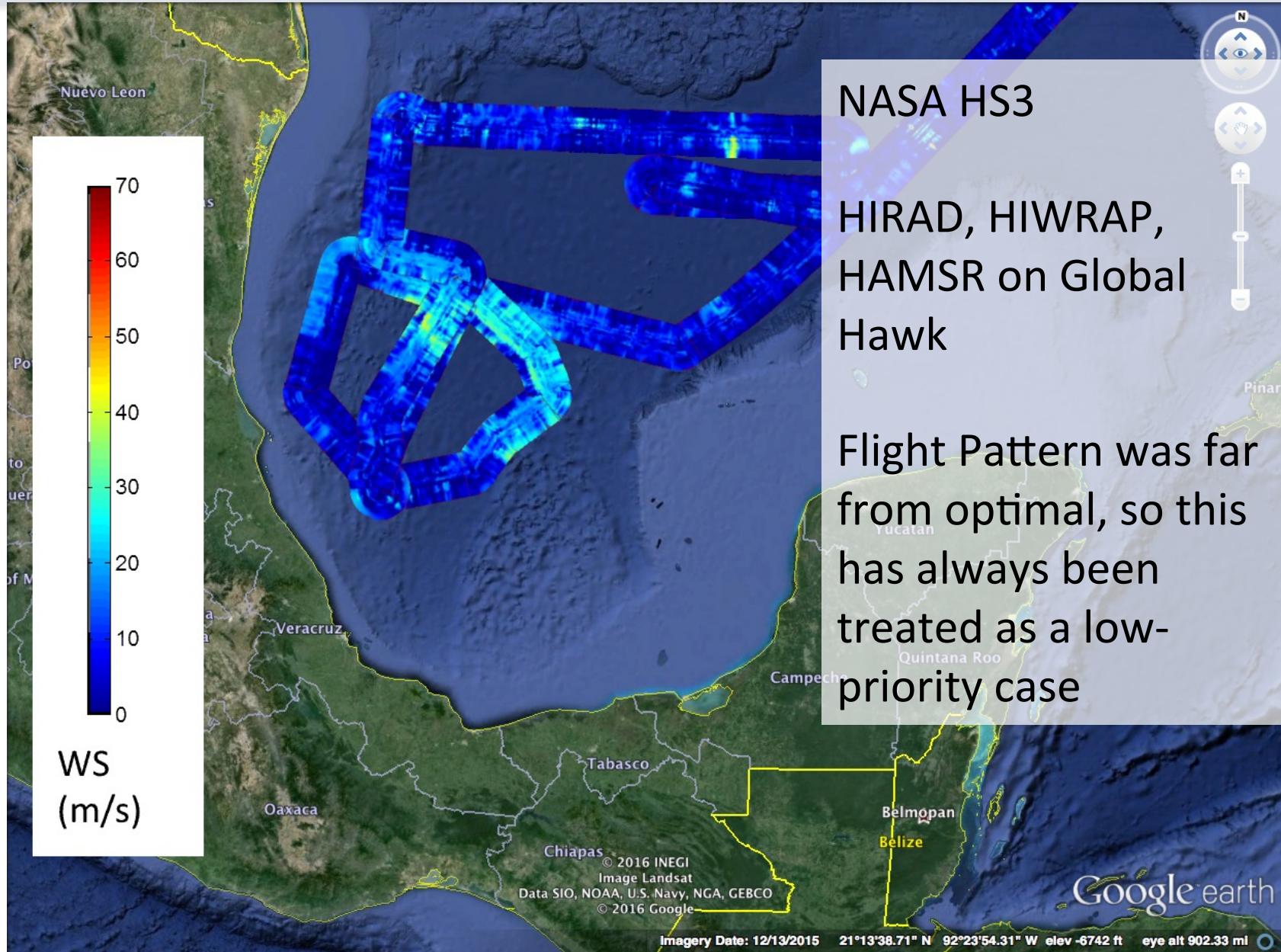
HIWRAP and
HAMSR on Global
Hawk (short
overlap in time
between the two
aircraft)



Wind Speed (left)



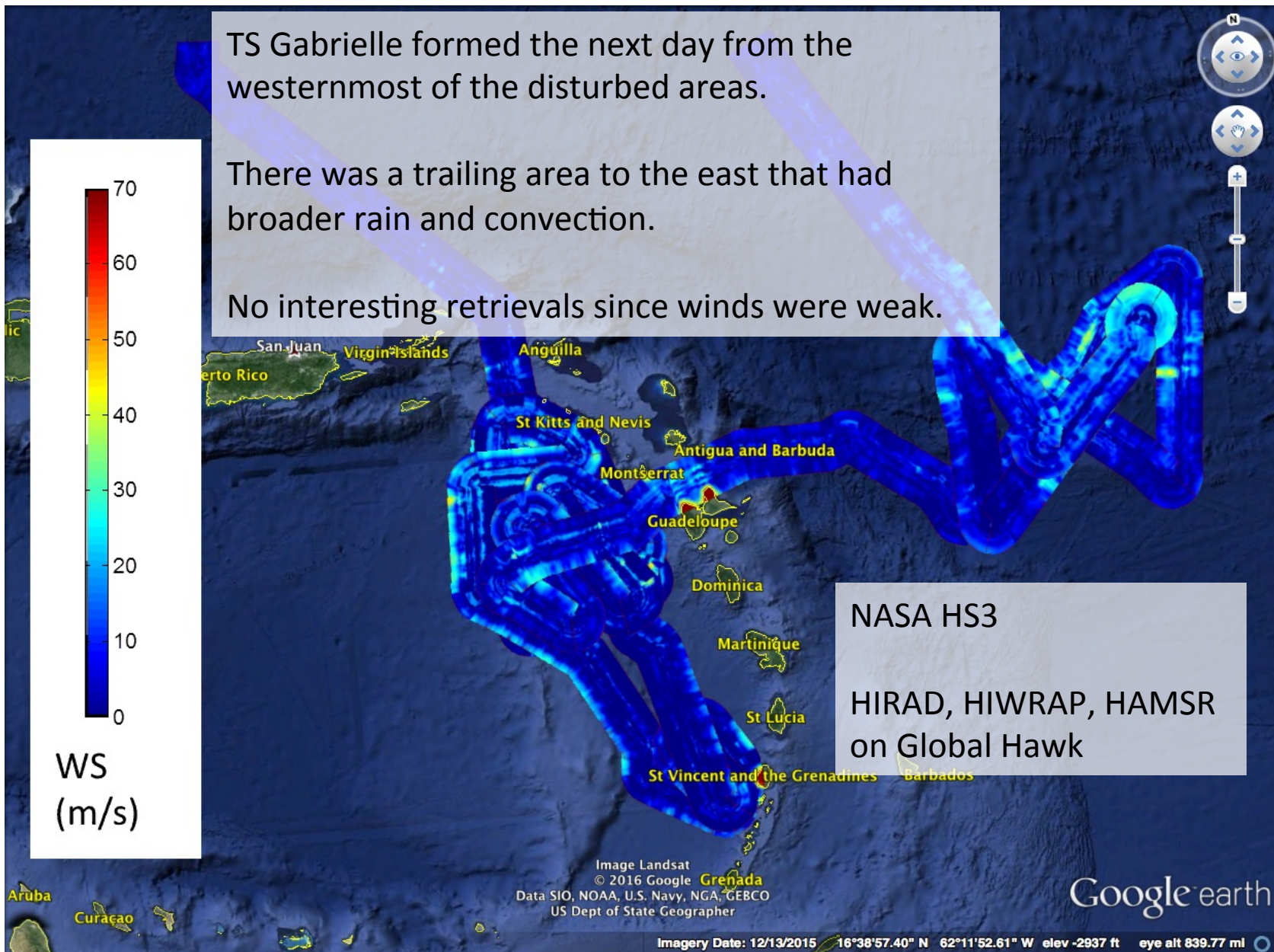
Rain Rate (right)



TS Gabrielle formed the next day from the westernmost of the disturbed areas.

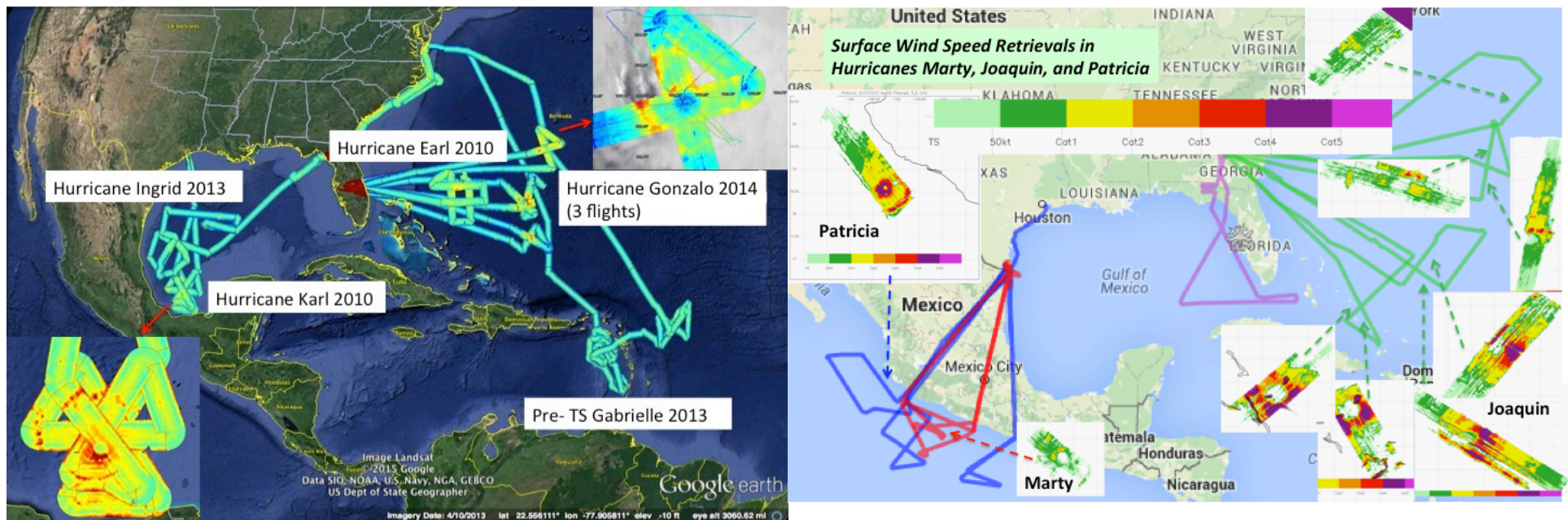
There was a trailing area to the east that had broader rain and convection.

No interesting retrievals since winds were weak.



- If you want to incorporate HIRAD data into a study of any of these storms, let us know – we might be able to improve the retrievals

The End



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 Karl 2010 Ingrid 2013
Gonzalo 2014 (3 flights)

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Patricia 2015 (3 flights)
 Marty 2015 (2 flights)